



SEQUENCE LISTING

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Yabuta, Masayuki  
Suzuki, Yuji

<120> Process for Producing Peptides Using a  
Helper Peptide

<130> 001560-373

<140> US 09/402,093  
<141> 1999-09-29

<150> PCT/JP99/00406  
<151> 1999-01-29

<150> JP 10-32272  
<151> 1998-01-30

<160> 70

<170> FastSEQ for Windows Version 4.0

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<223> Amino acid sequence adjacent to a site cleaved by  
enterokinase

<400> 1  
Asp Asp Asp Lys  
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<210> 2  
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<220>  
<223> Amino acid sequence adjacent to a site cleaved by  
blood coagulation Factor Xa

<400> 2  
Ile Glu Gly Arg  
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<210> 3  
<211> 7  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Amino acid sequence containing a site cleaved by  
renin

<400> 3  
Pro Phe His Leu Leu Val Tyr  
1 5

<210> 4  
<211> 6  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Amino acid sequence of helper peptide

<400> 4  
Val Asp Asp Asp Asp Lys  
1 5

<210> 5  
<211> 6  
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<220>  
<223> Amino acid sequence of helper peptide

<400> 5  
Gly Cys His His His His  
1 5

<210> 6  
<211> 10  
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<213> Artificial Sequence

<220>  
<223> Amino acid sequence containing a chemically  
cleaved site

<400> 6  
Pro Gly Gly Arg Pro Ser Arg His Lys Arg  
1 5 10

<210> 7  
<211> 10  
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<213> Artificial Sequence

<220>  
<223> Amino acid sequence of helper peptide

<400> 7  
His Arg His Lys Arg Ser His His His His  
1 5 10

<210> 8  
<211> 5  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Amino acid sequence containing a site cleaved by  
Kex2 Protease

<400> 8  
Ser Asp His Lys Arg  
1 5

<210> 9  
<211> 23  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Amino acid sequence containing a position cleaved  
by OmpT

<400> 9  
Gln Met His Gly Tyr Asp Ala Glu Leu Arg Leu Tyr Arg Arg His His  
1 5 10 15  
Arg Trp Gly Arg Ser Gly Ser  
20

<210> 10  
<211> 20  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Amino acid sequence containing a position cleaved  
by OmpT

<400> 10  
Gln Met His Gly Tyr Asp Ala Glu Leu Arg Leu Tyr Arg Arg His His  
1 5 10 15  
Gly Ser Gly Ser  
20

<210> 11  
<211> 69  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Nucleotide sequence coding for an amino acid sequence containing a site cleaved by OmpT

<400> 11  
cagatgcatg gttatgacgc ggagctccgg ctgtatcgcc gtcatcaccg gtggggtcgt 60  
tccggatcc 69

<210> 12  
<211> 23  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Amino acid sequence containing a site cleaved by OmpT

<400> 12  
Gln Met His Gly Tyr Asp Ala Glu Leu Arg Leu Tyr Arg Arg His His  
1 5 10 15  
Arg Trp Gly Arg Ser Gly Ser  
20

<210> 13  
<211> 47  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Nucleotide sequence coding for an amino acid sequence containing a site cleaved by OmpT

<400> 13  
tggttatgac gcggagctcc gcctgtatcg ccgtcatcac ggttccg 47

<210> 14  
<211> 55  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Nucleotide sequence coding for an amino acid sequence containing a site cleaved by OmpT

<400> 14  
gatccggaac cgtgatgacg gcgatacagg cggagctccg cgtcataacc atgca 55

<210> 15  
<211> 24  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Primer

<400> 15

gactcagatc ttccctgaggc cgat	24
<210> 16	
<211> 36	
<212> DNA	
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<223> Primer	
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aaaggtaacct tccgcattgc gcggatgtcg agaagg	36
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aggccaggaa ccgtaaaaag	20
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<223> Primer	
 <400> 18	
aaaatgcattc gcatcgtaac cgtgcattct	29
<210> 19	
<211> 627	
<212> DNA	
<213> Artificial Sequence	
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<223> Nucleotide sequence coding for a fusion protein	
comprising GLP-1, helper peptide and	
beta-galactosidase protective peptide	
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<222> (82) . . . (543)	
 <400> 19	
cccaaggcttt acactttatg ctcccggttc gtatgttgc tgaaattgtg agcgatataac 60	
aatttcacac aggaaacacgc t atg acc atg att acg gat tca ctg gcc gtc 111	
Met Thr Met Ile Thr Asp Ser Leu Ala Val	
1 5 10	
 gtt tta caa cgt aaa gac tgg gat aac cct ggc gtt acc caa ctt aat 159	
Val Leu Gln Arg Lys Asp Trp Asp Asn Pro Gly Val Thr Gln Leu Asn	
15 20 25	

cgc ctt gca gca cat ccc cct ttc gcc agc tgg cgt aat agc gac gac	207
Arg Leu Ala Ala His Pro Pro Phe Ala Ser Trp Arg Asn Ser Asp Asp	
30 35 40	
gcc cgc acc gat cgc cct tcc caa cag ttg cgc agc ctg aat ggc gaa	255
Ala Arg Thr Asp Arg Pro Ser Gln Gln Leu Arg Ser Leu Asn Gly Glu	
45 50 55	
tgg cgc ttt gcc tgg ttt ccg gca cca gaa gcg gtg ccg gca agc ttg	303
Trp Arg Phe Ala Trp Phe Pro Ala Pro Glu Ala Val Pro Ala Ser Leu	
60 65 70	
ctg gag tca gat ctt cct gag gcc gat act gtc gtc gtc ccc tca aac	351
Leu Glu Ser Asp Leu Pro Glu Ala Asp Thr Val Val Val Pro Ser Asn	
75 80 85 90	
tgg cag atg cac ggt tac gat gcg atg cat ggt tat gac gcg gag ctc	399
Trp Gln Met His Gly Tyr Asp Ala Met His Gly Tyr Asp Ala Glu Leu	
95 100 105	
cgc ctg tat cgc cgt cat cac ggt tcc gga tcc cct tct cga cat ccg	447
Arg Leu Tyr Arg Arg His His Gly Ser Gly Ser Pro Ser Arg His Pro	
110 115 120	
cgg cat gcg gaa ggt acc ttt acc agc gat gtg agc tcg tat ctg gaa	495
Arg His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu	
125 130 135	
ggt cag gcg gca aaa gaa ttc atc gcg tgg ctg gtg aaa ggc cgt ggt	543
Gly Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Arg Gly	
140 145 150	
taagtcgaca gcccgctaa tgagcgggct ttttttctc ggaattaatt ctcatgtttg	603
acagcttatac atcgataagc ttta	627
<210> 20	
<211> 154	
<212> PRT	
<213> Artificial Sequence	
<220>	
<223> Amino acid sequence of a fusion protein comprising	
GLP-1, helper peptide and beta-galactosidase	
protective peptide	
<400> 20	
Met Thr Met Ile Thr Asp Ser Leu Ala Val Val Leu Gln Arg Lys Asp	
1 5 10 15	
Trp Asp Asn Pro Gly Val Thr Gln Leu Asn Arg Leu Ala Ala His Pro	
20 25 30	
Pro Phe Ala Ser Trp Arg Asn Ser Asp Asp Ala Arg Thr Asp Arg Pro	
35 40 45	
Ser Gln Gln Leu Arg Ser Leu Asn Gly Glu Trp Arg Phe Ala Trp Phe	
50 55 60	
Pro Ala Pro Glu Ala Val Pro Ala Ser Leu Leu Glu Ser Asp Leu Pro	
65 70 75 80	

Glu Ala Asp Thr Val Val Val Pro Ser Asn Trp Gln Met His Gly Tyr  
85 90 95  
Asp Ala Met His Gly Tyr Asp Ala Glu Leu Arg Leu Tyr Arg Arg His  
100 105 110  
His Gly Ser Gly Ser Pro Ser Arg His Pro Arg His Ala Glu Gly Thr  
115 120 125  
Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly Gln Ala Ala Lys Glu  
130 135 140  
Phe Ile Ala Trp Leu Val Lys Gly Arg Gly  
145 150

<210> 21  
<211> 187  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Amino acid sequence of a fusion protein comprising  
GLP-1, helper peptide and beta-galactosidase  
protective peptide

<400> 21  
Met Thr Met Ile Thr Asp Ser Leu Ala Val Val Leu Gln Arg Lys Asp  
1 5 10 15  
Trp Asp Asn Pro Gly Val Thr Gln Leu Asn Arg Leu Ala Ala His Pro  
20 25 30  
Pro Phe Ala Ser Trp Arg Asn Ser Asp Asp Ala Arg Thr Asp Arg Pro  
35 40 45  
Ser Gln Gln Leu Arg Ser Leu Asn Gly Glu Trp Arg Phe Ala Trp Phe  
50 55 60  
Pro Ala Pro Glu Ala Val Pro Ala Ser Leu Leu Glu Ser Asp Leu Pro  
65 70 75 80  
Glu Ala Asp Thr Val Val Val Pro Ser Asn Trp Gln Met His Gly Tyr  
85 90 95  
Asp Ala Pro Ile Tyr Thr Asn Val Thr Tyr Pro Ile Thr Val Asn Pro  
100 105 110  
Pro Phe Val Pro Thr Glu Pro His His His His Gly Gly Arg Gln  
115 120 125  
Met His Gly Tyr Asp Ala Glu Leu Arg Leu Tyr Arg Arg His His Arg  
130 135 140  
Trp Gly Arg Ser Gly Ser Pro Ser Arg His Lys Arg His Ala Glu Gly  
145 150 155 160  
Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly Gln Ala Ala Lys  
165 170 175  
Glu Phe Ile Ala Trp Leu Val Lys Gly Arg Gly  
180 185

<210> 22  
<211> 184  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Amino acid sequence of a fusion protein comprising  
GLP-1, helper peptide and beta-galactosidase

protective peptide

<400> 22

Met Thr Met Ile Thr Asp Ser Leu Ala Val Val Leu Gln Arg Lys Asp  
1 5 10 15  
Trp Asp Asn Pro Gly Val Thr Gln Leu Asn Arg Leu Ala Ala His Pro  
20 25 30  
Pro Phe Ala Ser Trp Arg Asn Ser Asp Asp Ala Arg Thr Asp Arg Pro  
35 40 45  
Ser Gln Gln Leu Arg Ser Leu Asn Gly Glu Trp Arg Phe Ala Trp Phe  
50 55 60  
Pro Ala Pro Glu Ala Val Pro Ala Ser Leu Leu Glu Ser Asp Leu Pro  
65 70 75 80  
Glu Ala Asp Thr Val Val Val Pro Ser Asn Trp Gln Met His Gly Tyr  
85 90 95  
Asp Ala Pro Ile Tyr Thr Asn Val Thr Tyr Pro Ile Thr Val Asn Pro  
100 105 110  
Pro Phe Val Pro Thr Glu Pro His His His His His Gly Arg Gln  
115 120 125  
Met His Gly Tyr Asp Ala Glu Leu Arg Leu Tyr Arg Arg His His Glu  
130 135 140  
Ser Gly Ser Pro Ser Arg His Lys Arg His Ala Glu Gly Thr Phe Thr  
145 150 155 160  
Ser Asp Val Ser Ser Tyr Leu Glu Gly Gln Ala Ala Lys Glu Phe Ile  
165 170 175  
Ala Trp Leu Val Lys Gly Arg Gly  
180

<210> 23

<211> 184

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of a fusion protein comprising  
GLP-1, helper peptide and beta-galactosidase  
protective peptide

<400> 23

Met Thr Met Ile Thr Asp Ser Leu Ala Val Val Leu Gln Arg Lys Asp  
1 5 10 15  
Trp Asp Asn Pro Gly Val Thr Gln Leu Asn Arg Leu Ala Ala His Pro  
20 25 30  
Pro Phe Ala Ser Trp Arg Asn Ser Asp Asp Ala Arg Thr Asp Arg Pro  
35 40 45  
Ser Gln Gln Leu Arg Ser Leu Asn Gly Glu Trp Arg Phe Ala Trp Phe  
50 55 60  
Pro Ala Pro Glu Ala Val Pro Ala Ser Leu Leu Glu Ser Asp Leu Pro  
65 70 75 80  
Glu Ala Asp Thr Val Val Val Pro Ser Asn Trp Gln Met His Gly Tyr  
85 90 95  
Asp Ala Pro Ile Tyr Thr Asn Val Thr Tyr Pro Ile Thr Val Asn Pro  
100 105 110  
Pro Phe Val Pro Thr Glu Pro His His His His His Gly Arg Gln  
115 120 125  
Met His Gly Tyr Asp Ala Glu Leu Arg Leu Tyr Arg Arg His His Glu

130 135 140  
Ser Gly Ser Pro Ser Arg His Lys Arg His Ala Glu Gly Thr Phe Thr  
145 150 155 160  
Ser Asp Val Ser Ser Tyr Leu Glu Gly Gln Ala Ala Lys Glu Phe Ile  
165 170 175  
Ala Trp Leu Val Lys Gly Arg Gly  
180

<210> 24  
<211> 5  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Amino acid sequence containing a site cleaved by  
Kex2 Protease

<400> 24  
Ser Cys His Lys Arg  
1 5

<210> 25  
<211> 6  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Amino acid sequence containing a site cleaved by  
Kex2 Protease

<221> PEPTIDE  
<222> 6  
<223> Xaa = Gly

<400> 25  
Arg His His Gly Pro Xaa  
1 5

<210> 26  
<211> 37  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<400> 26  
His Asp Glu Phe Glu Arg His Ala Glu Gly Thr Phe Thr Ser Asp Val  
1 5 10 15  
Ser Ser Tyr Leu Glu Gly Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu  
20 25 30  
Val Lys Gly Arg Gly  
35

<210> 27  
<211> 30  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<221> VARIANT  
<222> 30  
<223> Amino acid 30 is attached by NH2

<400> 27  
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Arg  
20 25 30

<210> 28  
<211> 31  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<400> 28  
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Arg Gly  
20 25 30

<210> 29  
<211> 28  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<400> 29  
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys  
20 25

<210> 30  
<211> 29  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<400> 30  
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly  
20 25

<210> 31  
<211> 30  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<400> 31  
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Arg  
20 25 30

<210> 32  
<211> 28  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<221> VARIANT  
<222> 28  
<223> Amino acid 28 is attached by NH2

<400> 32  
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys  
20 25

<210> 33  
<211> 29  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<221> VARIANT  
<222> 29  
<223> Amino acid 29 is attached by NH2

<400> 33  
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15

Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly  
20 25

<210> 34  
<211> 31  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<221> VARIANT  
<222> 31  
<223> Amino acid 31 is attached by NH2

<400> 34  
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Arg Gly  
20 25 30

<210> 35  
<211> 32  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<400> 35  
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Arg Gly Arg  
20 25 30

<210> 36  
<211> 33  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<400> 36  
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Arg Gly Arg  
20 25 30

Arg

<210> 37  
<211> 32

<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<400> 37  
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Arg Gly Lys  
20 25 30

<210> 38  
<211> 33  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<400> 38  
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Arg Gly Lys  
20 25 30  
Lys

<210> 39  
<211> 33  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<400> 39  
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Arg Gly Lys  
20 25 30  
Arg

<210> 40  
<211> 33  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<400> 40  
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly

1 5 10 15  
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Arg Gly Arg  
20 25 30  
Lys

<210> 41  
<211> 31  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<221> VARIANT  
<222> 2  
<223> Xaa = Thr, Gly, Ser

<400> 41  
His Xaa Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Arg Gly  
20 25 30

<210> 42  
<211> 30  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<221> VARIANT  
<222> 30  
<223> Amino acid 30 is attached by NH2

<221> VARIANT  
<222> 2  
<223> Xaa = Thr, Gly, Ser

<400> 42  
His Xaa Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Arg  
20 25 30

<210> 43  
<211> 31  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<400> 43  
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Arg Glu Phe Ile Ala Trp Leu Val Lys Gly Arg Gly  
20 25 30

<210> 44  
<211> 30  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<221> VARIANT  
<222> 30  
<223> Amino acid 30 is attached by NH2

<400> 44  
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Arg Glu Phe Ile Ala Trp Leu Val Lys Gly Arg  
20 25 30

<210> 45  
<211> 31  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<400> 45  
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Arg Gly Arg Gly  
20 25 30

<210> 46  
<211> 30  
<212> PRT  
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<220>  
<223> GLP-1

<221> VARIANT  
<222> 30  
<223> Amino acid 30 is attached by NH2

<400> 46  
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Arg Gly Arg

20

25

30

<210> 47  
<211> 31  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<400> 47  
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Lys Gly  
20 25 30

<210> 48  
<211> 30  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<221> VARIANT  
<222> 30  
<223> Amino acid 30 is attached by NH2

<400> 48  
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Lys  
20 25 30

<210> 49  
<211> 31  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<221> VARIANT  
<222> 2  
<223> Xaa = Thr, Gly, Ser

<400> 49  
His Xaa Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Arg Glu Phe Ile Ala Trp Leu Val Lys Gly Arg Gly  
20 25 30

<210> 50

<211> 30  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<221> VARIANT  
<222> 30  
<223> Amino acid 30 is attached by NH2

<221> VARIANT  
<222> 2  
<223> Xaa = Thr, Gly, Ser

<400> 50  
His Xaa Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Arg Glu Phe Ile Ala Trp Leu Val Lys Gly Arg  
20 25 30

<210> 51  
<211> 31  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<221> VARIANT  
<222> 2  
<223> Xaa = Thr, Gly, Ser

<400> 51  
His Xaa Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Arg Gly Arg Gly  
20 25 30

<210> 52  
<211> 30  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<221> VARIANT  
<222> 30  
<223> Amino acid 30 is attached by NH2

<221> VARIANT  
<222> 2  
<223> Xaa = Thr, Gly, Ser

<400> 52  
His Xaa Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Arg Gly Arg  
20 25 30

<210> 53  
<211> 31  
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<220>  
<223> GLP-1

<221> VARIANT  
<222> 2  
<223> Xaa = Thr, Gly, Ser

<400> 53  
His Xaa Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Lys Gly  
20 25 30

<210> 54  
<211> 30  
<212> PRT  
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<220>  
<223> GLP-1

<221> VARIANT  
<222> 30  
<223> Amino acid 30 is attached by NH2

<221> VARIANT  
<222> 2  
<223> Xaa = Thr, Gly, Ser

<400> 54  
His Xaa Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Lys  
20 25 30

<210> 55  
<211> 31  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<400> 55  
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Arg Glu Phe Ile Ala Trp Leu Val Arg Gly Arg Gly  
20 25 30

<210> 56  
<211> 30  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> GLP-1

<221> VARIANT  
<222> 30  
<223> Amino acid 30 is attached by NH2

<400> 56  
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly  
1 5 10 15  
Gln Ala Ala Arg Glu Phe Ile Ala Trp Leu Val Arg Gly Arg  
20 25 30

<210> 57  
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